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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,460	07/18/2001	Lynn B. Lunsford	08191-014002	1198

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EXAMINER	
MARVICH, MARIA	

ART UNIT	PAPER NUMBER
1633	

NOTIFICATION DATE	DELIVERY MODE
11/06/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	09/909,460	LUNSFORD ET AL.	
	Examiner	Art Unit	
	MARIA B. MARVICH	1633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,52,63-69 and 85-113* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4, 52, 63-69 and 85-113* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/12/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Deleted: 1-5, 7-22, 24, 26, 27, 29-36, 51-58 and 62-84 are pending. Claims 17, 22, 24, 27 and 29-32 have been withdrawn. Therefore, claims 1-5, 7-17, 18-21, 26, 33-36 and 51-84

Claims 1, 4, 52, 63-69 and 85-113 are pending in the application. This office action is in response to an amendment filed 7/7/08.

In this response applicants have argued that the cited references do not constitute prior art as the instant application claims priority to PCT/US98/01499, filed January 22, 1998. It is noted that the claim of priority is 09/909460, filed 7/18/01 which claims priority to 09/321,346 filed 5/27/1999 which is a continuation in part of 09/266,463, filed 3/11/1999, which is a continuation in part of 09/003,253 filed 1/6/98 which claims priority to 60/035,983 filed 1/22/97 and PCT/US98/01499 filed 1/22/98. In the office action mailed 11/22/05, it was set forth that support for the limitation that a microparticle comprises in addition to a polymeric matrix and a nucleic acid, a lipid is not found in the priority documents 09/003,253 filed 1/6/1998, 60/035,983, filed 1/22/1997 or PCT/US98/01499 filed 1/22/1998. These applications are drawn to microparticles comprising polymeric matrices and nucleic acids. While these applications consider use of lipids as stabilizers present in excipients or formulations, the applications do not contemplate a microparticle comprising a lipid. This limitation has been added to prior applications 09/266,463, filed 3/11/1999. Therefore, a priority date of 3/11/1999 will be attributed to the instant claims. In response, applicants did not provide any evidence that an earlier priority date was supported and hence the art rejections set forth below are based upon a priority date of the claims of 3/11/1999.

It is also noted that applicants have amended claims 1 and 52 to recite that the polymeric matrix "consists essentially of one or more synthetic polymers having a solubility in water of less than about 1 mg/l". According to the MPEP (2105), "A consisting essentially of' claim occupies

a middle ground between closed claims that are written in a consisting of" format and fully open claims that are drafted in a comprising" format." " For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355". In this case, claims 66 and 96 dependent from claims 1 and 52 recite, The polymeric matrix comprises a synthetic, biodegradable copolymer" obviating the option that "consisting essentially of" can be construed as "closed".

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Claim Objections

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Claims 85-90 are objected to because of the following informalities: Claim 85 requires the word --of-- prior to the phrase "at least 7 amino acids". As well the phrase "and comprising a sequence identical" does not indicate that it is the at least 7 amino acids that are identical. Therefore, it would be remedial to recite --that are identical--.

Claim 85 is drawn to microparticles comprising a coding sequence wherein the coding sequence encodes an expression product of at least 7 amino acids in lengths. Each of claim 86 further limits claim 85 by recitation "wherein the expression product comprises a fragment of a protein selected". It appears that the fragment in claim 86 and the 7 amino acid sequence are the same which for clarity should be amended to recite --wherein the protein is selected-- in claim 86. Otherwise, it appears that there are two fragments in claim 86.

Similarly claims 87, 89 and 90 recite, "wherein the expression product comprises an amino acid sequence identical to a sequence", which also appears to be further modifying the

expression product as opposed to be introducing a second fragment into the expression product. As such, it would be clearer to recite in claim 87, --wherein the expression product is selected from the group consisting of--, in claim 89 to --wherein the expression product if from an antigenic portion of a tumor antigen-- and in claim 90 to "wherein the infectious agent is selected from the group consisting of:--.

Claim 88 requires the word "further" prior to "comprises a trafficking sequence" for clarity.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 52, 63-69 and 85-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedley et al (US Patent 5,783,567; see entire document) in view of Lambert et al (Biochimie, 1998, Vol 80, pages 969-976; see entire document) or Balland et al (NATO ASI Series, 1996, Vol 290, pages 131-142; see entire document) in view of Knepp et al (US 6,264,990; see entire document). This is a new rejection necessitated by applicants' amendment.

Deleted: Claim 14 recites "consisting of at least" in line 2, however, use of the closed term "consisting of" with "at least" which implies open language of comprising more than certain elements and amounts is not consistent. Either the claim should be amended to delete "at least" or to substitute "consisting of" with --comprising--. ¶
When referring to previously recited limitations it is customary to reference these limitations using either --the-- or --said--. In claim 16, "a peptide" should be amended to --the peptide--. In claim 51, "a target site" and "a mammal" should similarly be amended for clarity of antecedent bas

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Deleted: This is okay for them to say, they are linking length and function of binding instead of some other variation in the sequence.¶
¶

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The instant claims are drawn to a micro particle less than 20 microns in diameter comprising a polymeric matrix, a lipid and a nucleic acid, wherein the polymeric matrix has a solubility in water of at less than 1 mg/l and wherein at least 50% if the nucleic acids are supercoiled.

Hedley et al teach a microparticle as well as preparations of microparticles wherein the microparticles comprise a polymeric matrix and a nucleic acid expression vector. The polymeric matrix includes one or more synthetic polymers having a solubility of less than 1 mg/l that can be biodegradable. In certain cases, the polymeric matrix can be made of a single synthetic, biodegradable copolymer, e.g., poly-lactic-co-glycolic acid (PLGA). The ratio of lactic acid to glycolic acid in the copolymer can be within the range of about 1:2 to about 4:1 by weight, preferably within the range of about 1:1 to about 2:1 by weight, and most preferably about 65:35 by weight. In some cases, the polymeric matrix also includes a targeting molecule such as a ligand, receptor, or antibody, to increase the specificity of the microparticle for a given cell type or tissue type. The microparticles are at least 11 microns and the nucleic acid at least 80% supercoiled (see e.g. col 1-2). The nucleic acid include an expression control sequence operatively linked to an expression product encoding at least 7 amino acids having a sequence essentially identical to the sequence of either a fragment of a naturally-occurring mammalian protein or a fragment of a naturally-occurring protein from an agent which infects or otherwise harms a mammal; or a peptide having a length and sequence which permit it to bind to an MHC class I or II molecule (col 2, line 21-36).

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Lambert et al teach a microparticle less than 20 microns in diameter (see e.g. page 972, col 2, paragraph 2) comprising a polymeric matrix, a lipid and a nucleic acid (see e.g. page 970, col 1, paragraph 4- col 2, paragraph 3) and preparations of these microparticles (see e.g. table 1).

Balland et al teach a microparticle less than 20 microns in diameter (see e.g. page 132, paragraph 4) comprising a polymeric matrix, a lipid and a nucleic acid (see e.g. page 132, paragraph 4- 5) and preparations of these microparticles (see e.g. page 133, paragraph 4).

As an initial point, KSR forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See the recent Board decision Exparte Smith --USPD2d--, slip op. at 20, (BD. Pat. App. & Interfer. June 25, 2007). In this case each of Headley et al, Lambert et al and Balland et al teach design of microparticles that are less then 20 microns, as well as 1 microns. Each teaches that complexes of polymeric matrices and nucleic acids can be used to delivery the nucleic acids to cells. Headley et al teach that the polymeric matrix is preferably one that has a solubility of less then 1mg/L as in the recited claims. Specifically, Headley et al teach use of PLGA. Balland and Lambert et al do not explicitly teach that the polymers have a solubility of less then 1mg/L however, these references do teach that it was known in the art to include lipids in the preparation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the lipid which functions as an ion pairing agent with the phosphate groups of the nucleic acids (see e.g. Lambert et al page 270, col 2 and figure 1). Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

Deleted: as recited in claims 1, 7 and 52. Lambert et al teach antisense oligonucleotides associated with nanoparticles and the cationic lipid cetyltrimethylammonium (CTAB). (see e.g. page 970, col 2, paragraph 3) as recited in claims 53-55. The particles are resuspended in medium (see table 1), which is a pharmaceutically acceptable carrier as recited in claim 70. The nucleic acid is an oligonucleotide as recited in claim 75. The polymeric matrix is polyisobutylcyanoacrylate (see e.g. bridging paragraph col 1-2, page 970), which is a synthetic biodegradable copolymer as evidenced by Balland et al (see e.g. page 131, paragraph 1) as recited in claims 65 and 66

Deleted: as recited in claims 1, 7 and 52

Deleted: The lipid is cetyltrimethylammonium (CTAB) and is cationic (see e.g. page 131, paragraph 2) as recited in claims 53-55. The particles are resuspended in PBS (see page 133, paragraph 4), which can be a pharmaceutically acceptable carrier as recited in claim 70. The nucleic acid is an oligonucleotide as recited in claim 75. The polymeric matrix is polyisobutylcyanoacrylate (PIHCA), which is a synthetic biodegradable copolymer (see e.g. page 131, paragraph 1 and page 132, paragraph 4) as recited in claims 65 and 66. Balland et al teach that the nucleic acid was protected against enzymatic degradation (see table 1) and uptake by cells was dramatically increased (figure 2) by complex formation with CTAB.

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Deleted: Neither Lambert et al nor Balland et al teach a composition, in particular that a microparticle further comprises a carbohydrate. ¶ Knepp et al teach formation of a nucleic acid particle comprising lipids, nucleic acids and carbohydrates such as sucrose that function as protective agents (see e.g. col 8, line 14-22 and col 10, line 27-36). Knepp et al teach that lipid nucleic acid complexes facilitate nucleic acid u ... [1]

Deleted: carbohydrate such as sucrose

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Deleted: Knepp et al in the microparticles taught by Lambert et al or Balland et al because Knepp et al teach that it is within the ordinary skill of the art to use carbohydrates in a nucleic acid delivery particle comprising lipids and nucleic acid and because Balland (... [2]

Claims 1, 4, 52, 63-69, 85, 86 and 88-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paphadjopolous et al (US 6,210,707; see entire document) in view of Cleek et al (J. Biomed. Materials Res., 1997, pages 325-520; see entire document) as evidenced by Manoharan et al (2005/0153337; see entire document). **This is a new rejection necessitated by applicants' amendment.**

Papahadjopolous et al teach a lipidic microparticle comprising lipids and nucleic acids (see e.g. abstract) and polymeric matrices (see e.g. col 3, line 50-67). The invention is designed to provide lipid: nucleic acid complexes that have increased shelf life, for transfection of mammalian (see e.g. col 18, line 50-53). The lipidic-microparticles can be made with amphiphilic cationic lipids complexed with nucleic acids and polymer (see e.g. col 7, line 16-29). The microparticles can be part of a preparation and are each less than 11 microns (see e.g. col 8,line 34-41 and col 18, line 29-47) as recited in claims 1, 7, 52 and 64. The nucleic acid can be part of an expression cassette that is disclosed as being expression vectors or plasmids, which are circular, expressing polypeptides (see e.g. col 8, line 21-26, col 11, line 41-51). The expression cassettes encode polypeptides such as globin, which comprise at least 7 amino acids identical to at least a fragment of a naturally occurring mammalian protein. The microparticles further comprise a targeting moiety (see e.g. abstract). The targeting moiety can be attached to the microparticle during production or can be expressed by the nucleic acid of the microparticle. Paphadjopolous specifically describes peptides that bind MHC molecules. The instant specification describes proteinaceous antigenic determinants as containing an epitope, which limitation is met by the use of ligands on the microparticle. Thus a microparticle with such a

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Deleted: Knepp et al (US 6,264,990; see entire document)

Deleted: cells *in vitro* or *in vivo* or *ex vivo*

Deleted: as recited in claim 2-4, 62 and 71

Deleted: The lipids of the microparticle can be amphiphilic cationic lipids such as phospholipids (see e.g. col 6, line 41-51) and the microparticles and hence the preparations of microparticles are also associated with a second lipid or neutral helper lipid (see e.g. col 3, line 31-50) as recited in claim 9, 11, 13, 53, 54, 56 and 58.

Deleted: as recited in claim 8 and 16

Deleted: as recited in claim 5

Deleted: The targeting moieties are immunogenic peptides as recited in claims 18 and 21 such as ligands, growth factors or cytokines (see e.g. col 7, line 4-16, col 15, line 31-52) and

Deleted: targeting moieties that recognize MHC complexes (i.e. MHC I) (see e.g. col 15, line 23-col 16, line 11).

Deleted: as recited in claim 8 (b)

targeting moiety and a nucleic acid encoding an antigenic polypeptide such as hGH (see e.g. col 19, line 32-37). Furthermore, it is contemplated that the microparticle encodes a trafficking signal (see e.g. col 12, line 4-12).

Paphadjopolous does not teach that the polymeric matrix is PLGA wherein the ratio of lactic acid to glycolic acid is in a range of 1:2 to about 4:1 or about 65:35 by weight. Applicants' disclosure appears to suggest that PLGA is a polymer that meets the claims requirements of a synthetic polymer with a solubility if less then 1 mg/l in water.

Cleek et al teach use of microparticles for inhibition of smooth muscle cell growth. The microparticles are comprised of nucleic acid and PLGA, one of the few synthetic biodegradable polymers approved for human clinical use (see e.g. page 525, col 2, paragraph 2). PLGA degradation *in vivo* occurs by random non-enzymatic hydrolysis of the polyester bonds along the polymeric backbone at a rate dependent on the copolymer ratio. As they are hydrolyzed to lactic acid and glycolic acid, they are processed normally by the metabolic pathway and eliminated as carbon dioxide (see e.g. page 525, col 2, paragraph 2). The biodegradable PLGA particles were formed in a 1:1 ratio which is in the range of 1:2 to 4:1 and is about 65:35 ratio given that the term "about" is a relative term for which the specification provides no definition. The PLGA served as effective delivery agents (see e.g. page 529, col 2, paragraph 4). While Cleek et al do not teach that the ratio of lactic acid to glycolic acid is "by weight", classically synthesis of PLGA from lactic acid and glycolic acid involves a combination of the monomers "by weight' as evidenced by Manoharan et al (see e.g. paragraph 0873).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the PLGA particles as taught by Cleek et al in the lipid microparticles taught by

Deleted: meets the claim limitations as recited in claim 72 and 73

Deleted: Paphadjopolous further contemplate administration of the microparticles to mammals for gene therapy in which the microparticle is administered in an effective amount at a target sites such as the circulatory system (see e.g. col 4, line 51-66 and col 8, line 8, line 64-67) as recited in claim 51. Specifically, Paphadjopolous describe targeting the microparticles to immune cells (see e.g. col 22, line 46-64), which would result in elicitation of an immune response as recited in claim 34.

Deleted: microparticle encode

Deleted: as recited in claim 26 or an oligonucleotide (see e.g. col 19, line 10-31) as recited in claim 74, 75 and 76

Deleted: The microparticle can be a preparation of particles and is in a pharmaceutically acceptable carrier (see e.g. col 8,line 34-41) as recited in claim 33 and 70. The polymer can be spermine, a biodegradable polymer (see e.g. col 3, line 50-52) as recited in claim 65.

Deleted: Paphadjopolous do not teach inclusion of a carbohydrate i.e. sucrose in the particle. ¶
The teachings of Knepp et al are reviewed above. ¶
It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the carbohydrate or sucrose as taught by Knepp et al in the microparticles taught by Paphadjopolous because Knepp et al teach that it is within the ordinary skill of the art to use carbohydrates in a nucleic acid delivery particle comprising lipids and nucleic acid and because Paphadjopolous teaches that it is within the ordinary skill of the art to deliver nucleic acids as part of microparticles that comprise polymeric matrices and lipids. One would have been motivated to add carbohydrate to the microparticles for their protective properties. Knepp et al demonstrates an attempt to use known techniques to improve similar microparticles as Paphadjopolous using skill that was available at the time of filing with well-established methods on well-characterized systems. Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention. ¶
¶
Claims 12, 57 and 77-80 are rejected under 35 U.S.C. 103(a) as being ... [3]

Paphadjopolous et al because Cleek et al teach that it is within the ordinary skill in the art to use PLGA to deliver nucleic acids to cells and because Paphadjopolous et al teach that it is within the ordinary skill of the art to complex synthetic polymers, i.e. PLGA, to nucleic acid for stable delivery to cells. One would have been motivated to do so in order to receive the expected benefit that the microparticles comprised of PLGA are among the few synthetic biodegradable polymers approved for human clinical use because they are hydrolyzed to lactic acid and glycolic acid, they are processed normally by the metabolic pathway and eliminated as carbon dioxide and they serve as effective delivery agents (see Cleek et al, page 525, col 2, paragraph 2 and page 529, col 2, paragraph 4). Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

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Based upon a reconsideration of the art, the previous new rejections have been made.¶

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Conclusion

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA B. MARVICH whose telephone number is (571)272-0774. The examiner can normally be reached on M-F (7:00-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Woitach, PhD can be reached on (571)-272-0739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Maria B Marvich, PhD
Primary Examiner
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